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Pam

THE MODERN MINOTAUR.

BY F. W. BIRD.

Proles biformis

Minotaurus inest, Veneris monimenta nefandae.

—ÆNEID, LIB. VI., V. 25 & 26.

We, too, have a Minotaur—a double-faced monster, born of unholy lust, and devourer of precious treasure.

—FREE TRANSLATION.

Ref.
385
B

BOSTON:

WRIGHT & POTTER, PRINTERS, 4 SPRING LANE.

1868.

Ref.
385-
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S. A. Thesens
Death of our
minature.

THE MODERN MINOTAUR.

Once a year a ship, laden with the richest jewels of her people, left the port of the ancient Athens. The time for the annual tribute to the Minotaur had come. Athens' noblest citizens, in sad procession, attended the victims to the Piræus, imploring for these young men and maidens, the bravest and most beautiful of her youth, the benedictions of the Commonwealth for which they were about to lay down their young lives, and weeping most of all that they should see their faces no more ; and thus those unreturning feet embarked on that dreadful voyage.

" Built in the eclipse and rigged with curses dark,"

her black sails proclaiming her dismal errand, the luckless bark bore the choicest wealth of Athens to the cavern of the insatiable monster.

Once a year a demand is made for the treasures of her citizens upon our modern Athens. The time of our annual contribution to a relentless destroyer has come. True, our sons and daughters are not literally required for the sacrifice ; but the products of our industry, the hard-earned fruits of muscle and brain, are borne to those dismal caverns of the Hoosac Mountain, from which there are no outward steps.

Ancient Athens made the dreadful sacrifice to avert destruction at the hands of the conqueror. No such necessity is laid upon us ; but voluntarily, with alacrity, year after year, we throw our jewels into this insatiable maelstrom. Is there no deliverance from this humiliating tribute ? this waste of treasure ? this public and private demoralization, which always grows out of submission to insolent exactions ?

The answers to these questions, as applied to our Minotaur—the Hoosac Tunnel—involves the discussion of these three points: The cost of the tunnel, the time of completion, and its value when completed.

WHAT WILL THE TUNNEL COST?

It will be curious as well as pertinent, to refer for a moment to the estimates of cost made from time to time by the friends of the tunnel. In 1848, when the charter was granted, the petitioners proved (!) that the road and tunnel could be built for \$3,500,000; that the entire road from Troy to Greenfield (exclusive of the tunnel,) would be built in eighteen months; and that the tunnel itself could be completed, without the aid of shafts, in fifteen hundred and fifty-six working days—just five years! That prediction was made twenty years ago.

I will not produce, in detail, from speeches, pamphlets, reports of legislative committees, &c., &c., estimates and predictions of a similar character, all for a similar purpose, that is, to delude the legislature into granting some favor, and all falsified by events. These statements were generally made by parties directly interested in the tunnel, and on that account, it may be said, were to be received with allowances. Referring to them as only furnishing proof of the general proposition that all estimates heretofore made have proved worthless, we come to the first report upon this subject, to which no exception like the above can be taken, at least, by the friends of the tunnel,—the report of Messrs. Brooks, Felton and Holmes, Commissioners, &c., &c. In that report, (pp. 55, 56 and 57,) their own estimate and those of other engineers are given, of cost, including interest during construction, of completing the tunnel, as follows:—

Commissioners' estimate,	. . . .	\$3,218,323 00
Mr. Storror's “	. . . .	3,773,368 00
Mr. Latrobe's “	. . . .	2,837,485 00
Mr. Laurie, with central shaft and hand labor,		3,430,780 00
“ “ “ and machines,		3,050,180 00

The Commissioners' estimate of the entire cost of the road both sides of the mountain and the tunnel, including what the

State had advanced previous to 1862, including interest compounded at five per cent. for eight years, also including depot building, shops, rolling-stock, &c., &c., for the entire line, was \$5,719,330.

Among the items, the Commissioners estimate the central shaft, "20 feet in diameter, including machinery, 1,027 feet in depth, containing 11,944 cubic yards, at \$22 per yard, \$262,768." Mr. Crocker's report this year gives the cost of the central shaft, including machinery, up to January 1, 1868, as \$269,924. Of the 1,030 feet, 583 feet have been sunk, costing seven thousand dollars more than the Commissioners' estimate of the cost of the whole. Of course, as the depth increases, the cost, owing to increase of water, extra distance of raising water and material, and increased liability to accident, will be much greater than heretofore.

But, without comparing items, let us compare the total results up to this time with the estimates of total cost. The cost of work done by the State since 1862, has been as follows, with interest compounded at six per cent:—

Cost for two years to November 1, 1864, (House	
Doc. No. 3, 1865, p. 25,)	\$415,483 00
Interest from May, 1864, to January 1, 1868,	100,608 00
Cost from November 1, 1864, to November 1, 1865,	
(House Doc. No. 4, 1866, p. 53,)	477,142 00
Interest from May, 1865, to January 1, 1868,	81,528 00
Cost from Nov. 1, 1865, to Nov. 1, 1866,	590,904 00
Interest from May, 1866, to January 1, 1868,	61,249 00
Cost from November 1, 1866, to January 1, 1868,	603,666 00
Interest from June, 1867, to January 1, 1868,	21,218 00
<hr/>	
Total expenditure by State, with interest to	
January 1, 1868,	\$2,351,798 00

It thus appears that of the Commissioners' estimate of cost in 1863, \$3,218,323, very nearly three-fourths, is already spent. What portion of the whole has been done for this money?

The amount excavated has been as follows:—

TOTAL WORK DONE TO JANUARY 1, 1868.

Tunnel Proper.

In 1864,	750 cubic yards.
1865,	4,484 " "
1866,	7,469 " "
1867,	14,410 " "

Central Shaft.

In 1864,	1,092 cubic yards.*
1865,	1,340 " "
1866,	1,993 " "
1867,	2,698 " "

West Approach.

290 feet, 30 cubic yards per foot, . . .	8,700 cubic yards.†
Total excavation by State, . . .	42,936 cubic yards.

Now the total amount of excavation to be done *at the commencement* was as follows:—

24,862 feet entire Tunnel, (18 cubic yards per foot,)	447,516 cubic yards.
Add for extra excavation for arching 2,004 feet, 12 yards per foot,	24,048 " "
Central Shaft, 1,037 feet, 12 yards per foot,	12,444 " "

Total excavation at commencement, . 484,008 cubic yards.

Deduct excavation :

By Haupt & Co., (cubic yards,) 23,866	
State, (cubic yards,)	42,936
	71,802 cubic yards.
Leaving amount remaining undone Janu- ary 1, 1868,	412,206 cubic yards.

* Including 300 cubic yards of earth.

† I am at a loss to know how to fill out this item. Mr. Latrobe (p. 48,) seems to suggest that 10,000 cubic yards have been taken out at the west end. Now, the whole amount of excavation at the east end and the west shaft, working at three faces during the year, has been only 14,410 cubic yards. It certainly is inconceivable that five-sevenths as many yards have been taken out at one face of the extremely difficult material at the west end as have been removed at three faces of good material. I have, however, credited the full amount, allowing 30 cubic yards to each foot of progress. Everything relating to this part of the work is obscure; but I allow an extravagant estimate.

It thus appears that the Commissioners estimated the cost of completing the Tunnel, in 1863, at \$3,218,323 ; that there has been expended since then, \$2,351,798 ; that of the whole work, (484,008 cubic yards at the commencement,) 71,802 yards have been excavated ; that is, one-seventh, or $14\frac{8}{10}$ per cent. of the work has been done, and three-quarters of the estimate is spent.

Or, to take the more correct view of the proportion of work done since 1862,—

Total excavation at commencement,	. 484,008 cubic yards.
Deduct excavation by Haupt & Co.,	. 28,866 “ “
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Remaining to be done, 1863,	. 455,142 cubic yards.
Excavation by State to January 1, 1868,	42,936 “ “

That is, a little over one-eleventh, or nine and four-tenths per cent., of the work has been done in five years, and three-quarters of the estimate is spent.

All the estimates as to the *time* of completing the tunnel have proved equally unreliable. I will not repeat the predictions of its early friends ; *their* longest periods expired long ago ; but come down to the calculations of the Commissioners, in their first report above referred to. After making a detailed statement of expected progress, they say, (p. 61,) that by hand labor alone it would take eleven years and four months to finish the whole work ; but by introducing machines, (p. 61,) the total time would be seven and a half years ; and they add : “It is quite possible that the machine drills may be used in sinking the central shaft, &c. The chances of increased speed from this source are, perhaps, sufficient to counterbalance any delay likely to occur in other parts of the work, and make from seven and a half to eight years a reasonable estimate of the time required to complete the work from the time it is vigorously undertaken.” Well, it was “vigorously undertaken” in the summer and fall of 1863. Nearly five of the eight years have elapsed, and, including work done by Haupt & Co., one-seventh of the work is done !

Mr. Latrobe, in his first report, (House No. 30, 1867,) makes an estimate of cost and time of completing. Of course, with

the results of five years' work before him, his estimates are made with great caution and with large margins. Time alone can test his estimates as it has those of the first Commissioners. He thinks the tunnel can be completed in eight and a half years from January 1, 1867, and that it will cost \$3,633,640, *not* including interest.

A very brief comparison of Mr. Latrobe's estimates, with actual results of this last year, will illustrate the reliability of any estimates. Mr. Latrobe calculates, (House Doc. No. 30, 1867, p. 77 *et seq.*) that the east end enlargement would be completed in September, 1867. At the time this calculation was made, there were 37,000 cubic yards of excavation to complete the enlargement. The actual amount removed up to January, 1868, as stated by Mr. Crocker, (Senate Doc. No. 20, 1868, p. 9,) has been 4,391 cubic yards; so that instead of the whole 37,000 cubic yards being excavated in eight months, less than one-eighth of the whole was excavated in twelve months. Again, Mr. Latrobe estimates the amount of excavation required to complete the enlargement at the west shaft to be, in December, 1866, 17,040 cubic yards, and that the enlargement can be completed in a year. The actual amount of excavation in the enlargement at the west shaft during thirteen months has been:—

East heading,	820	cubic yards.
West heading,	1,280	“ “
<hr/>		
Total,	2,100	“ “

Thus, instead of excavating the whole, 17,040 cubic yards in a year, they have actually excavated 2,100 yards, or less than one-eighth in thirteen months.

Again, Mr. Latrobe predicts a progress at the west end of 35 feet per month. I confess myself utterly unable to make out from any or all the reports what the actual progress has been. The table in Mr. Latrobe's report (p. 49) states progress at west end as 356 feet, which is also called "completed tunnel." Whether this means that the west end heading has advanced 356 feet, and that this has all been arched and completed, or whether the 356 feet of completed tunnel have been partly

of new heading and partly of old, is left in entire obscurity; and this obscurity is made more obscure by a change in the descriptive phraseology on the profiles of the two years. The profile for the year 1866 (House, No. 30, 1867,) gives length of "W. End heading 1,010 feet;" the profile for 1867 (Senate, No. 20, 1868,) gives length of "W. End heading 637 feet." It would seem that the west end heading has diminished 373 feet within the last year. The trouble is, undoubtedly, that the measurement starts from different points in the two reports, but no intimation is given of a change, and therefore the two profiles furnish no data for a comparison to ascertain progress during the year. One thing is certain, that the progress has been nothing like that predicted by Mr. Latrobe, (35 feet per month,) although Mr. Farren has attacked the demoralized rock with desperate energy.

Again, to illustrate the value of estimates of cost, Mr. Latrobe (House No. 30, 1867, p. 82,) gives the following

ESTIMATE OF COST.

54,000 cubic yards in enlargements at \$5,	\$270,000 00
325,000 " " heading and bottom, at an average of \$7.50,	2,437,500 00
7,538 c. y'ds in remainder of c'ntral shaft, \$30,	226,140 00
1,000 ft. linear at west end, next portal, \$400,	400,000 00
1,000 " " " " " shaft, \$300,	300,000 00
	<hr/>
	\$3,633,640 00

Now the whole amount of excavation since that estimate was made has been, in round numbers, 25,808 cubic yards. The expenditures for that period were \$603,666; giving twenty-three dollars as the cost of each cubic yard of excavation last year, instead of five or seven and a half dollars. The average cost of the whole, was double Mr. Latrobe's estimate of cost of removing the demoralized rock.

I have dwelt upon this, perhaps, unnecessarily long; but it seemed important to show how utterly unreliable all estimates of cost or time have heretofore been, even when made, as those I have referred to were, by the most competent men in the country. Nobody questions, least of all do I question Mr. Latrobe's

integrity, impartiality and capacity. If any man could make reliable estimates, he could.

From this examination—and it might be carried to almost any extent with the same results—it is perfectly apparent that no estimates as to the future are entitled to the slightest confidence; that unforeseen difficulties are constantly developing; that the expense of machinery will increase rather than diminish; and that the only basis for a reliable calculation of the cost and time of completing the tunnel will be found in the actual results of the work for the last year or two. These two years have shown more favorable results than can be expected hereafter. Everybody knows that the farther the work goes into the mountain the greater will be the cost. The ordinary expenses increase, and the extraordinary expenses, owing to increase of water and other hidden difficulties, may increase indefinitely.

The friends of the tunnel surely cannot complain of our adopting the results of these two years as the basis of a calculation for the future. Two years ago they proclaimed that up to that time heavy expenditures had been incurred in making preparations for effective work, but then they were all ready and would show great results during the next year. The next year went by, and a year ago we were treated to the same old story of unforeseen difficulties, but at last they were nearly ready, and they assured the legislature that if the ensuing year did not show results justifying their claims, they would give up their case; and they carried the appropriation through the House upon the appeal, "They say the work has never yet been in the hands of practical men; now they have got their own man—Colonel Crocker—let them have one year more." Well, they have had it, and now, on the basis of the work of this year,

WHAT WILL IT COST TO COMPLETE THE TUNNEL?

On page six, we have found the amount remaining undone January 1, 1868, was 412,206 cubic yards.

Now, the expenditure for these fourteen months has been \$603,666; the total excavation, 25,808 cubic yards; the excavation remaining to be done, 412,206 cubic yards. The problem is a very simple one: If the excavation of 25,808 yards

cost \$603,666, what will 412,206 yards cost? Answer, \$9,640,000.

But this is not the whole of the cost. It does not include interest. For how long shall the interest be computed? If it required fourteen months to excavate 25,808 yards, how long will it take to excavate 412,206 yards? Answer, 224 months, or eighteen years and eight months! (This is what the Ajax Telamon of the tunnel has accomplished in a year of unlimited control. His matchless energy has driven the work at a rate which will complete the tunnel in eighteen years!)

Now it will not be said that Mr. Crocker has not done all that was in his power. *He* knew the assurances of great progress which were given last winter. He felt as no other man could feel, that his reputation was at stake; and he applied himself for every day and every hour of the time, with enthusiasm, energy and will, for all of which qualities I cheerfully admit he is distinguished, to show great results. That Mr. Crocker has accomplished all that was practicable in pushing the *headings*, I think no one will doubt. As Mr. Latrobe says, "The heading is being pushed wildly on, *under the specious idea that popular favor will be best propitiated by a mere progress in running feet.*" (P. 53. The italics are Mr. Latrobe's.) In the headings, then, Mr. Crocker has undoubtedly done all that was possible. The enlargement might have been pushed more vigorously, and it may be hereafter, until it overtakes the headings. Suppose this is done, and that two more faces are opened, a year or two hence, from the central shaft, and allowing that on these accounts the time, after opening the faces from the central shaft, may be shortened one-half, say to eleven years; dividing the whole cost into eleven equal parts, each part representing the expenditure of a year, and computing the interest on each half-year's expenditure, from the time of the expenditure to the end of the eleven years, compounded semi-annually, and we have the following result:—

Cost, without interest,	\$9,640,000 00
Expenditure each year, \$964,000:	
Interest,	3,728,690 00
Total cost of completing work, undone Jan.	_____
1838, including interest,	\$13,368,690 00

But this is not all. I had almost overlooked the insignificant item of a million or two spent last year, or to be spent hereafter, on the railroad. Indeed, it is not strange that this item should be omitted, for there is not the slightest allusion to the amount expended on the road in the reports. We have the report of Hon. Alvah Crocker, Commissioner, and of Hon. Alvah Crocker, Acting Superintendent, and now the Resident Engineer, Mr. Granger, having *retired*, and the reports of the Consulting Engineer and of the Resident Engineer, and a letter from Josiah Brown, whom Colonel Crocker certifies to be "a competent engineer," and a paper called "Accidents—Casualties," stated by Colonel Crocker to be "Mr. Peet's report," (which we must believe to be the fact, at least that it could not have been written by Colonel Crocker; for it contains a paragraph charging to Mr. Doane the responsibility of an accident from the use of gun cotton on March 18th, because "Mr. Doane before leaving had ordered Mr. Hill to use the article, without the knowledge of the Commissioners, Mr. Crocker being engaged between the 5th and 18th upon the pumps at the West Shaft." A captious person might suggest that, as Mr. Doane left the tunnel January 4, 1867, and as Colonel Crocker was in charge of the work ten weeks before the accident occurred, it is singular that Mr. Doane's order had not been countermanded,) and the report of the Operative Chemist, and, last but not least, the report of "ALFRED R. FIELD, *Chief Engineer Troy and Greenfield Railroad*." From none of these reports could we infer that a dollar had been spent by or under the Commissioners, except as stated on page 23 of Colonel Crocker's report. Mr. Field, indeed, speaks, on page 77, of an expenditure of "about \$15,000," for certain purposes there stated, and the inference would be that that was the whole amount expended on the road, except what is contained in Colonel Crocker's "statistical account." I do not charge an intention to deceive; but I do say, that in an official report to the legislature upon a public work of this character and magnitude, there is not the slightest allusion to an expenditure of nearly half a million dollars. I do not suppose that this omission would not have been discovered by the legislature; but I confess that, though pretty familiar with this whole subject, and perhaps specially suspicious of trickery, this omis-

sion did not occur to me until after all my calculations of cost had been made and printed.

In a paper published within a few days Mr. Shute states the expenditures on the railroad last year to have been \$371,296. (This amount, added to the amount stated by Mr. Crocker, viz., \$603,666, gives \$974,962 as the amount of money taken from the treasury and expended on the entire work last year!)

Mr. Farren's contract provides for completing the road to the mountain for \$545,000. Of this, \$371,296 having been paid him, we assume that he will finish the road for the balance, \$173,000.

Another item of heavy cost is the building of the road from the west end of the tunnel to the Troy and Boston Railroad. A reference to Mr. Latrobe's report, (pp. 45 and 46,) and Mr. Crocker's, (pp. 17 and 18,) shows that this is to be a very expensive work, made more expensive by the culpable neglect of the Commissioners in not securing the right of way, before the land had so largely increased in price. This road, two miles long, will cost, if ever built, half a million dollars. I put it down, to avoid cavil, at \$250,000.

Again, if the tunnel is ever opened for use, the road must be equipped; and if run by another corporation, it must pay, directly or indirectly, for its fair proportion of the equipment of the whole line. Now the average cost per mile of equipment—that is, for passenger and freight cars and locomotives—in this State is over \$8,000. To do the same traffic, this road must have an equal equipment, that is, for $42\frac{1}{2}$ miles, \$340,000.

To this must be added, for shops, station-houses, &c., &c., &c., say, at a low figure, \$100,000.

Again, Mr. Crocker says a railroad bridge over Deerfield River near the tunnel, estimated by Mr. Field, chief engineer, to cost \$25,000, (it will probably cost more than double that,) and a common road over the same river, must be built. Put them down as costing only \$30,000.

"A new road up the Deerfield, from the mouth of the tunnel," is a recently discovered necessity, "so important," grandiloquently says Mr. Crocker, "in the development of this section of Massachusetts." One would suppose that the "Deerfield River" was almost navigable above this point; at least, available, when this section is "developed," for water

power; whereas, it is a mere mountain brook, with hardly water enough in the summer, a mile or two above the tunnel, to turn a child's mimic water-wheel. But this section of Massachusetts is to be "developed." It will next be found to be a political, as well as a financial necessity to build the common roads, as well as the railroads, of Franklin County.

Indeed, Mr. Crocker (p. 21,) recommends the "improvement of the common road over the mountain," the State nominally to aid other parties, "one spirited individual," really, in the end, as in the case of the tunnel, to do the whole.

How much will these two, the road up the Deerfield River and the road over the mountain, cost? I don't know, Mr. Crocker has not told us, how far up the valley of the Deerfield is to be "developed." We must guess. Call both \$20,000.

We have then the following items of additional cost:—

Finishing of railroad east of mountain,	.	.	\$173,000 00
“ “ west of “	.	.	250,000 00
Equipment,	.	.	340,000 00
Station-houses, shops, &c., &c.,	.	.	100,000 00
Bridges across Deerfield River,	.	.	30,000 00
Roads up the river, &c., over the mountain,	.	.	20,000 00
			<hr/>
Total,	.	.	\$913,000 00

More than one-half of this amount must be spent at once; the balance might be postponed till near the time of opening the tunnel. It will be fair, then, to compute the interest on half this amount, say on \$450,000, for ten years. This, compounded annually, would be \$354,690. We have then the following as the aggregate of the various items of cost of finishing the tunnel and road *from this date*:—

Cost of tunnel and interest, (page 11,)	.	.	\$13,368,690 00
Cost of additional items, (above,)	.	.	913,000 00
Interest on one-half, say \$450,000,	.	.	354,690 00
			<hr/>
Total cost of road and tunnel,	.	.	\$14,636,380 00

I hardly need repeat that this result comes from premises mainly taken from official reports of the special friends of the

tunnel. I have reduced the time one-half from what it would be at the rate of last year's work; I have made no allowance for the additional cost which the inevitable increase of water and other unforeseen difficulties must cause; so far as estimates are made, I have followed the reports whenever they have given us any light, and in other cases have put the cost, as I honestly believe, fifty per cent. below what will be found to be the actual cost, should the work ever be done; and there is the result.

I am well aware that the friends of the tunnel will exclaim, "These figures are too extravagant to be entitled to a moment's consideration." Such has always been the cry with which they have tried to evade the effect of facts. I have only to reply: For twenty years you have made predictions which have uniformly and grossly failed, and no man not afflicted with tunnel on the brain will place the slightest reliance on any similar predictions from the same parties. Careful, candid men, of large acquaintance with such works, sympathizing with the enterprise, but under no bias which could lead them to hazard their professional reputations by making too favorable estimates, have, from time to time, made estimates of cost; but results have invariably shown the cost to be two to four times larger than their figures. What are we, the tax-payers, to do? Let you go on, after misleading, deluding, humbugging us out of our money, year after year, and place the same faith in your mistaken calculations, your falsified predictions, your broken promises? No, gentlemen; it may be sport to you, but it is death to us. We mean to look this thing in the face. For five years you have had the State treasury at your control. We have given you all you asked for—time and money to fulfil your promises—and if ever the time is to be when we must disenchant ourselves of all hallucinations and appeal to results, the time has come. If five years of work, carried on in your own way, has not brought us to a point where we can test the cost by actual results, we never shall reach it; and we must drive on wildly, blindly, at whatever cost, or stop where we are.

I repeat, then, most emphatically, there is no other reliable method of ascertaining the cost of completing the tunnel than by making the past the basis of estimates for the future, and when we take the results of the best year in the past, no charge of unfairness can be sustained.

But it may be claimed that incidental expenses have been proportionally larger last year than they will be hereafter. I take the liberty to doubt. Mr. Crocker's policy has been to show the largest possible results with the least possible expenditure, and accordingly his whole system (if system it can be called,) has been one of make-shifts; penny wise and pound foolish, carried to such an extent as to call forth the repeated disapproval and rebukes of Mr. Latrobe.

Indeed, a comparison of the expenditures for machinery, buildings, &c., during the last two years, gives the following result: (Report, 1868, p. 23.)

	From Nov. 1, 1865, to Nov. 1, 1866.	From Nov. 1, 1866, to Jan. 1, 1868.
Deerfield dam,	\$2,063 00	—
East End dam,	266 00	—
Wheelpits and house,	24,845 00	\$2,300 00
Gates and overflow,	566 00	—
Race, or canal,	2,064 00	325 00
Buildings, East End,	3,837 00	—
“ Central shaft,	2,406 00	1,953 00
“ West End shaft,	6,933 00	1,028 00
“ general account,	1,842 00	149 00
Machinery, Deerfield dam,	523 00	—
“ East End,	66,494 00	43,231 00
“ Central shaft,	28,891 00	7,773 00
“ West shaft,	20,723 00	17,909 00
“ West End,	503 00	36 00
“ general account,	43,673 00	1,370 00
Totals,	\$205,629 00	\$76,074 00

It thus appears that the expenditures from November, 1865, to November, 1866, for buildings, machinery and appurtenances, were nearly three times as large as the expenditures for the same purposes from November 1, 1866, to January 1, 1868.

Nobody will pretend that the expenditures for the former of these periods were not proper; every building, every piece of machinery, has been since used by Mr. Crocker. There is no pretence that any expenditure was made not absolutely necessary to supply new machinery and buildings as they were needed, or to keep the old in repair; and therefore the inference is a fair one, that Mr. Crocker has reduced the expenditures on build-

ings and machinery to their *minimum*, and applied every available dollar to pushing the excavation.

But my purpose in copying these figures was to show that there has no unusual proportion of the expenditures of last year gone into buildings and machinery, and, therefore, that the cost of excavation last year furnishes too favorable a basis for estimating future cost. I think any fair-minded man will say that the cost hereafter will be greater, rather than less, than it was last year, on account of this policy of Mr. Crocker to get all possible work out of the buildings and machinery at the least temporary expenditure.

But this is not all. In the expenditures of last year no charge is made of the value of buildings and machinery burned at central shaft. This sad affair, which involved the destruction of two hundred thousand dollars' worth of property, the suspension of the work on the shaft for an indefinite period, and the death of thirteen men, is dismissed by Mr. Crocker (Report, p. 10) in two lines, referring us "for detailed account to Mr. Peet's report herewith." We find no report from Mr. Peet, but an anonymous paragraph in the Appendix (p. 74) informs us that "the fire destroyed the shaft building, machine shop, blacksmith shop, office, saw-mill, wood-shed, together with a large amount of material and machinery, including about five hundred cords of wood and thirty-five thousand feet of lumber, making a total loss of at least \$40,000." Mr. Latrobe (Report, p. 33) refers to it as the disastrous fire which destroyed the buildings and machinery, &c., &c." I assume then that all the buildings and machinery were destroyed, excepting, of course, that parts of the machinery which are not combustible will be worth something. The report says, "The total loss was *at least* \$40,000." There is a great deal of virtue in that "at least."

The cost of buildings and machinery at the Central Shaft is stated in the last report, (p. 23,) to have been, up to January 1, 1868, as follows:—

Buildings,	\$13,980 00
Machinery,	59,137 00
<hr/>	
Total cost,	\$73,117 00

Add to this the value of the wood, lumber and other material destroyed, and I think it will be agreed that the writer was safe in stating the total loss to have been *at least* \$40,000. This loss, nearer \$80,000 than \$40,000, is fairly to be added to last year's expenditures, when we use those expenditures as the basis of an estimate of future cost.

If any honest man is inclined to believe that the expenditures for machinery, &c., will be less hereafter than heretofore, let him read carefully the reports of Col. Crocker and of Mr. Latrobe, and note the expenditures there foreshadowed. The new flume, new turbine wheels, steam-engines, to take the place of water-power when the water fails from drought in summer and anchor-ice in winter ; machine drills—Mr. Latrobe, (p. 56,) suggests that there ought to be three times as many on hand as there now are at the tunnel ; pumps—the doctors disagree on this matter. Mr. Latrobe shows very clearly that Mr. Crocker's system of makeshifts works especially badly in this department ; that “the pumps are reported to be subject to pretty frequent stoppage for repair ;” that the present arrangement can take out “about twenty-nine per cent. in excess of the present influx of water, and may be sufficient for some little time to come, at the slow rates at which the East Heading is advancing, &c. With a more rapid progress of both these headings, [so desirable (!)] a correspondingly rapid increase of water may reasonably be expected, and the margin of pumping power will be found too small.” After speaking of the kind of pumps which he recommends, Mr. Latrobe says : “Such engines would have undoubtedly cost more *at the outset* than the machines which have been employed, but they would have been more reliable, and *in the end more economical*, where the great object, in a financial and economical point of view of the great work, is duly considered.” “I do not find fault with the temporary use of small, cheap pumps heretofore, to save time while large and effective ones were in preparation ; but looking now at the fact that the flow of water has been increased from twenty-five gallons in 1864, to one thousand gallons in 1867, the prudence of ample provision of the proper sort for farther increase, not, it is to be hoped indeed, in that high ratio, is most earnestly enjoined.”

Mr. Latrobe is very decided, also, in the opinion that the main pumps ought to be outside of the tunnel, for the reason that "the position of these and the larger pumps *within* the tunnel, although attended with advantage on the score of economy in the transmission of steam and assistance to ventilation, is coupled with the risk of submersion and damage, should the tunnel again fill in consequence of serious disaster to the pumps." (It will be remembered that the work in the West Shaft was stopped from four to six months last year on account of water.) But Mr. Crocker adheres to the makeshift system, and declares, most emphatically, "Were I to express my humble opinion, or if the work was my own, I would not freight the heavy Wilmington machinery, (the pumps recommended by Mr. Latrobe,) for a year's use of it, if the freight was the only charge. When Well No. 4 and the adit between it and West Shaft is finished, I shall transfer the pumping machines to it, and save thirty-two feet of lift, or thirteen and one-half per cent.; and I want no pump or boiler that I cannot easily move from its present position in the supplementary shaft."

Thus do the doctors disagree. Meantime, the patient pays the bills. Whichever system is adopted—Mr. Latrobe's, who comprehends the magnitude of the enterprise, and who would adopt a system which shall be most effective and most economical in the long run; or Mr. Crocker's, whose system is one of temporary expediency, running for luck, aiming to show great immediate apparent results, believing that every additional appropriation made by the State increases the probability that she will keep on—whichever system is adopted, everybody knows that the cost of maintaining, repairing and replacing machinery, worked as all machinery performing such service must be, is very great; and however Mr. Crocker may strive to present only the bright side, the fact is, that hereafter the legitimate annual expense for machinery will be greater than the average for the last five years, (omitting the Deerfield dam as strictly exceptional.)

But even this calculation, with its frightful result, is made upon a basis too favorable to be applied to future operations. About one-third of the excavation last year was done by Dull, Gowan & Co., under contract. Of the whole 25,808 cubic yards, Dull, Gowan & Co. removed 2,944 cubic yards of heading

and 4,391 yards of enlargement, total 7,335 yards, for which, under their contract, they were paid \$53,110, averaging \$7.24 per cubic yard, while the work done under Mr. Crocker cost \$29.70 per cubic yard.

Deducting the amount paid them from the total expenditure of the 14 months, \$603,666—\$53,110=\$550,556, which is the amount it cost the State to excavate 18,473 cubic yards. The question of the cost of completing the tunnel on this basis would be answered by the solution of the following problem: If 14,473 yards cost \$550,556, what will 412,206 yards (remaining undone January 1, 1868,) cost? Answer, \$15,628,000, without interest!

Of course the work done by Dull, Gowan & Co. is fairly chargeable with its proportion of contingent expenses borne by the State, and this would increase the cost of that portion of the year's work and diminish proportionately the cost of the portion done by Mr. Crocker, and thus bring the cost of completing the work, on the basis of work done by Mr. Crocker last year, somewhat below this sum.

In another respect, certainly, the cost of the *whole* work of last year, gives too favorable a basis for future calculations. Over one-third of the work of the year was done *at prices below cost*,—so much below as to *break down the contractors*. It would be clearly unfair to claim that the work hereafter can be done as low as it was done last year, when over one-third of last year's work was done below cost, under a contract made with able, energetic men, who struggled desperately to make their ends meet and failed. And yet Mr. Crocker is using the result of the labors of men who worked for the State to their own loss, to prove that hereafter *he* can carry on this work to an early completion, while his own work cost the State at least three times as much per cubic yard as that done by the very men whose work at ruinous prices lie makes the foundation of his claim to triumphal achievements in the future.

Of course it is unfair to compare Dull, Gowan & Co's. work with a portion of that done by Mr. Crocker, as some portion, the west approach for instance, was much more costly, and for this reason it will not do for Mr. Crocker to claim that he can complete the tunnel at the price per yard paid to Dull, Gowan & Co.

Hitherto, I have calculated only the cost of completing the tunnel from January 1, 1868. My aim has been to confine attention to the single question, Is the tunnel worth finishing to-day? Is it better to lose what we have expended, or to expend ten or fifteen millions more, and in the end lose the whole?

But this record of folly would be incomplete if we omit the entire cost *to the State* of this enterprise from the beginning. The first report of the Commissioners (p. 23,) gives the net amount, principal and interest, of the advances by the State up to January 1, 1863, as \$968,862. The sums expended from that time to January 1, 1868, were as follows:—

In 1863, (one-half of two years, \$415,483,)	. \$207,742 00
1864, . . . . .	. 207,742 00
1865, . . . . .	. 477,142 00
1866, . . . . .	. 590,904 00
1867, . . . . .	. 975,514 00
	<hr/>
	\$2,459,044 00

The interest on the advances from January 1, 1863, and on the expenditures from their dates respectively to the time we have estimated for the completion of the tunnel, January 1, 1879, amounts to \$3,516,000.

We have then the following as the

TOTAL COST TO THE STATE OF ROAD AND TUNNEL FROM THE
BEGINNING TO ITS COMPLETION.

Amount of advances to 1863,	\$908,862 00
of expenditures from 1863 to 1868,	2,459,044 00
Interest on above, to January 1, 1879,	3,516,000 00
Cost of completing, from January 1, 1868, (ante, p. 14,)	14,636,380 00
	<hr/>
Ultimate cost to the State,	\$21,520,286 00

And this estimates for a single track only. Another track will add, for construction and iron, nearly a million more.

This is the entertainment to which we are now invited by the

men who originally humbly asked the State for the privilege of "building their own road with their own money."

I am aware that the figures representing the ultimate cost of this work are startling compared with the confident assertion of the tunnelites ; they seem too extravagant for credit. But I challenge the most captious critic to detect a flaw either in the premises or the result. I have shown that all the predictions of the friends of the work have been falsified, their estimates of cost have been exceeded five to tenfold ; that the most careful estimates of engineers, fair-minded and scientific experts, have uniformly fallen fifty, a hundred, two hundred per cent. short of actual results. I have taken the past as the only reliable basis, and the last year as the most favorable year. I have shown why the result of last year's operations was more favorable than can reasonably be expected hereafter, for three reasons :—1st, Because over one-third of the work was done for less than cost ; 2d, because under Mr. Crocker's makeshift policy, the depreciation of machinery has not been provided for ; 3d, because, inevitably, as the tunnel progresses into the mountain, the cost, from increase of distance, water, and other hidden difficulties, *must increase*. I have, however, added nothing to the cost hereafter on these accounts, but have calculated it on the basis of last year's work, and there is the result ; and I defy criticism. Clamor, glamour, hallucinations, will no longer avail. Let the friends of the tunnel point out the mistake in these figures, or let them honestly state that they ask an appropriation this year, for the prosecution of a work which must cost the people of this State from this time forward, principal and interest, from twelve to twenty millions of dollars.

But admitting, for a moment, that we are all wrong,—that the premises furnished by Mr. Crocker and his friends are incorrect, that the calculations are bad, the rules of arithmetic are suspended, that the multiplication table lies, and "division is as bad,"—let us estimate the cost of completing road and tunnel on the basis of Mr. Latrobe's estimate in his first report. He prudently omits interest. We will supply it. His estimate is, that the tunnel can be completed in eight and one-half years from January 1, 1867, at a cost of \$3,633,640 without interest. (Since that time, one-sixth of this amount has been expended and one-fourteenth part of the work has been done.) To this

is to be added the cost of the road. We have to pick up the items as we best can. I will assume it to be \$625,000. (It will largely exceed that.) This will make the cost of road and tunnel, from January 1, 1867, \$4,258,640. This would allow an expenditure of \$500,000 yearly. Computing the interest on the half-yearly expenditures at six per cent., compounded semi-annually, and the amount would be—

Principal,	.	.	.	.	.	.	.	\$4,258,640	00
Interest,	.	.	.	.	.	.	.	1,358,175	00
									<hr/>
Total cost, under Mr. Latrobe's estimate,									\$5,616,815 00

We come now to the second question :—

HOW LONG WILL IT TAKE TO FINISH THE TUNNEL ?

Here again, we must discard all predictions. Twenty years ago it was to be finished in three to five years. Mr. Brooks estimated from seven and one-half to eight years. Five years have gone, and thirteen and one-third per cent. of the whole has been done. Mr. Latrobe calculated last year that it could be “ finished in eight and one-half years from January 1, 1867.” Well, we have since then the result of fourteen months of active work, driven as it never was driven before, viz. : during these fourteen months, one-seventeenth, or $5\frac{9}{16}$ per cent. of the work undone Nov. 1, 1866, has been done ; which would give for one year's work at the same rate, a trifle over five per cent. of the whole. These calculations show how utterly unreliable any estimates are as to time, as well as to cost.

Taking, then, last year's work as the basis of calculation for the future, we arrive at the following result. On the first of January, 1868, there were 412,306 cubic yards of rock to be excavated. In fourteen months, they had removed 25,808 yards, which would give for twelve months 22,110 yards. If it took one year to remove 22,110 yards, how long would it take to remove 412,306 yards ? Answer, two hundred and twenty-four months, or eighteen and two-thirds years. Now, the victims of tunnel on the brain may scout at these figures ; but the premises are undeniably correct, and the logic is irresistible.

But, assuming as we did in calculating the cost, that, by working two additional faces at the Central Shaft, and increas-

ing the force upon the enlargement, they double the progress, (it will be three years before the Central Shaft reaches grade, even at the rate of progress of last year,) this will carry them through in twelve or thirteen years; and this, upon their own premises, with their own results, is the shortest possible time for the completion of this new avenue for the wealth of the West to Massachusetts—this is the result of the method of the Railway King to meet the immediate exigency for the commercial necessities of Boston!

We come now to the most important question, perhaps, of all,

WHAT WILL THE TUNNEL BE WORTH?

I admit that if it can be shown conclusively or even reasonably that this road will be worth all it costs, all my figures about cost are wasted. If it were clearly shown that as an investment the tunnel would pay, the State might have some justification for undertaking it. Or, if the opening of this route would develop the resources of this State, or if it reached new fields of wealth or traffic in other States, and thus brought new business to Massachusetts, I agree that these advantages might be of such magnitude as to render its construction by the State comparatively unobjectionable. Can either of these propositions be maintained?

WILL THE TUNNEL PAY AS AN INVESTMENT?

The question is answered before it is asked. If the road to the Hudson River through the tunnel should ever be opened, it must compete, *as an entire line, for through freight*, which, its friends admit, must be its main reliance, with the Boston and Albany road and other lines bringing Western traffic to Boston, and of course cannot charge for through freight, to or from Troy, higher rates than the other roads charge for similar traffic.

The Boston and Albany road will have cost, with double track, \$17,500,000, or nearly \$90,000 per mile; and, considering it solely as a matter of dollars and cents, the managers graduate their tariff for freight and passengers with reference to fair dividends on that sum, and no road can compete successfully with that road if they charge higher rates. Of course, then, unless it can be shown that the traffic will be larger on the tunnel

route than on the Boston and Albany, the tariff must be substantially the same on each line.

In arranging the division of receipts between the different roads composing the tunnel line, each road must receive its proportion according to *its length*, and not according to *its cost*. The connecting roads may now, *for a purpose*, make professions of a willingness to allow the Troy and Greenfield road more than its proportional share of the income; but this will last only till the State is in so deep that she must go through. In the end this line will be managed just as all similar railroad lines in the world are managed—each road will receive its share of income in proportion to its length, and no more.

It is fair to assume that the tunnel line, if finished through, will cost, (not including the tunnel,) about the same as the Boston and Albany road, \$90,000 per mile. This is about the average of well-equipped double-track roads in Massachusetts. In the division of receipts with connecting roads, the Troy and Greenfield road would be entitled to $\frac{4\frac{2}{3}}{19\frac{1}{2}}$ of the income of the entire line, and its whole income could pay a dividend only on the fair cost of its road as compared with other roads—that is, to a dividend on \$3,800,000. All that the tunnel costs, over this amount, on this theory, will be dead loss.

I need not say that this calculation assumes half a dozen favorable elements which do not and never will exist in this case. It assumes that the local traffic on this forty-two and a half miles will be the same as on the rest of the line and on competing roads; it assumes that at the start the through traffic will be the same on this line as on the Boston and Albany; it assumes that, with a half a dozen lines competing for Western traffic, a link in this line, with an entirely insignificant local traffic, can derive a remunerating income from through traffic alone.

But I waste time in showing what even its friends admit, that the tunnel can never pay as an investment, and that every dollar put into it by the State will be lost. But the opening of another avenue to the West! The pouring of the products of Western prairie and forest into Boston, making her the commercial metropolis of the continent! Let us look at this soberly. We have been humbugged long enough.

The simple question is, Is there any exigency for another railroad to connect the New York Central Railroad with Boston?

THE COMPARATIVE LENGTH OF THE ROUTES.

It seems to have been taken for granted that there is a large saving in distance by the Tunnel route, over the Western. As a specimen of these disingenuous—I will not say dishonest—attempts to mystify the public on this point, look at a table of distances given by Hon. Alvah Crocker, in a speech in the Senate in 1862. True, he states that it is “a table of distances *from Troy* ;” but the table is got up to show the advantage of the tunnel route over the Western, and the design is to give the impression that it is a fair statement of the relative merits of the two routes in this respect. Otherwise, the table has no meaning. Thus he gives the distance “to Boston, *via* Western Railroad, 208 miles ;” *via* Troy and Greenfield, 189 miles.” Most people would understand this to mean that Boston is nineteen miles nearer to the West by the tunnel route than by the Western. The rest of his table is equally deceptive, or more so.

Now, the competing point is Schenectady. All the through traffic for both these routes comes to that point. Thence it is brought either by the New York Central road to Albany, for the Western road, or to Troy, for the tunnel route. The distances from Schenectady to Boston are,

From Boston to Schenectady, by Tunnel line,	. 212 miles.
From Boston to Schenectady, by Western line,	. 217 miles.

The tunnel line is five miles shorter, but this difference, as a matter of time, would be nearly offset by the reduced speed at which trains would be obliged to run through the tunnel.

WILL THE TUNNEL ROUTE OPEN A NEW TRAFFIC?

Will it tap the West at a different point from existing routes? If it established a connection with a new line of railroad, or with the traffic which reaches the seaboard by way of Lake Ontario, it would be a great point in its favor. But, confessedly, it does nothing of the kind. It simply goes to Schenectady, and then asks the New York Central road for a share in

the traffic which otherwise would come through Albany to Boston. Clearly, then, the tunnel can make no pretensions that it will bring an additional ton of Western freight to Boston, *provided the Western road has capabilities for bringing all that offers.*

In dealing with this matter, we are to consider only the question whether the Western road is capable of bringing *eastward*, from Albany, all the traffic that seeks Boston.

I am not considering what the Western Railroad has done with a ferry at Albany, with forty miles of single track, with its present equipment and *under its present management*; but what it is *capable of doing* with a bridge over the Hudson, with a double track all the way, and under a management fully alive to the duty of making available the highest resources of modern railroad science and of meeting the commercial exigencies of the day.

With a double track, and with an adequate equipment, there is hardly a limit to the capabilities of a railroad. Thus the Pennsylvania Railroad is to-day taking freight trains of two hundred and forty tons each over its road, with a grade of 95 feet to the mile for fifteen miles; whereas, the maximum grade on the Western road eastward is $75\frac{1}{2}$ feet to the mile for seven miles. This load of 240 tons is the gross weight of cars and freight, exclusive of engine and tender. Freight cars, well filled as through cars always are, constitute something less than fifty per cent. of the gross weight of the train. This will give something over fifty per cent. as the proportion of paying freight. Calling the net freight as fifty per cent. of the whole load, and we have 120 tons of paying freight to each train. On a double track road, with double the number of passenger trains now run by the Western road, freight trains can be run every twenty minutes and keep out of the way of passenger trains. We will estimate for a freight train each half hour. This will give 240 tons of freight per hour, 5,760 tons per day, and 1,797,120 tons in the year of 312 working days. This is eleven times the amount of freight (162,638 tons,) brought eastward by the Western road last year.

But this calculation assumes that freight engines are used of the same size, or but a trifle larger than those now used on the Western road; whereas, engines are now built, specially

adapted to heavy traffic, which will carry nearly double the load above stated. The introduction of them would increase the capacity of the Western road to over three millions of tons eastward annually. Practically, there is hardly a limit to the freighting capabilities of a double track road with adequate equipment.

But cavillers may say, "These are estimates; give us results actually accomplished." They are estimates; but their correctness cannot be disputed. However, here are facts. The New York Central road, with a local traffic probably three times as large as that of the Western Railroad, brought to Albany in 1866 600,000 tons of through freight. What hinders the Western road, with double track and fully equipped, bringing the same amount of freight to Boston? The Pennsylvania Railroad, crossing the Alleghanies with heavy grades, carried about 2,600,000 tons of freight eastward, and the capacity of that line in the estimation of the directors was 6,000,000 of tons! These are *facts*; and what this road can do, the Western can do.

But the old bugbear of the high grade on the Western road. Of course, no one denies that the tunnel line has this advantage; that its maximum grade going east is somewhat less than that of the Western. But this is only a question of increased cost of freight. With auxiliary power used on the five miles of maximum grade near Pittsfield, this disadvantage would be entirely overcome. With this overcome, the Western line is exactly equal as to grades, (in curves it has the advantage,) to the tunnel line. What will it cost to put these two roads on a par in this respect?

It reduces itself simply to the cost of auxiliary power to haul the freight up the five miles of maximum grade. Throughout the rest of its entire line, the Western road is in every respect equal, and, as to curves, superior to the tunnel line. What, then, will be the

ANNUAL COST OF AUXILIARY POWER

for these five miles?

I submitted this problem to a friend who is an accomplished engineer, who replied as follows:—

"The problem given by you, if I understand it aright, was to determine the cost of an assistant engine on five miles of 75 feet grade, and the number of tons that could be passed, allowing thirty minutes between trains. The cost of a first-class engine, with engineer, fireman, fuel and repairs, was formerly covered by about \$20 per day. Owing to the large increase in all expenses, we will call it \$40. 100 miles per day, at an average of 10 miles per hour, is a full day's work for a freight engine. If trains run day and night, there will be 48 trains, in the 24 hours, with 30 minutes intervals. One engine can make ten round trips over the grade; 48 trips will require five engines on road, and a reserve of two engines in shop,—in all, seven. Cost per day of engines, $5 \times 40 = \$200$. An engine weighing thirty tons will haul fourteen cars, weighing seven tons each, with a load of ten tons, on a grade of 75 feet to the mile.

"If, on other parts of the line, the maximum grade eastward be assumed at 50 feet, an engine can haul on this grade twenty cars, and, aided by the assistant engine on the steep grade, twenty cars to a train would measure the capacity of the road. 48 trains in 24 hours, 200 tons to a train, 300 days to a year, would give a capacity for eastward freights uniformly distributed, and all the cars fully loaded, of 2,880,000 tons; but this regularity of movement is unattainable. It may be calculated, however, that the capacity would not be less than 1,500,000 tons.

"The cost of the assistant engines would be $\$200 \times 300 = \$60,000$ allowing for interest on cost of reserve engines, extra wear of track, &c., \$20,000; total, \$80,000, to cover all contingencies. This is equivalent to $5\frac{1}{3}$ cents per ton; or one cent per ton per mile on the steep grade, will cover the cost of assistant power, and add 50 per cent. to the capacity of the road."

This estimate, it will be observed, gives \$80,000 as the extra cost for auxiliary power for 1,500,000 tons; that is, it will cost to bring 1,500,000 tons of freight to Boston by way of Albany \$80,000 more than it will to bring the same amount of freight to Boston by way of Troy—nearly ten times the largest amount of through freight ever brought in one year from Albany to Boston. And this constitutes the whole of the exigency for building another railroad to connect with the New York Central Railroad. Not another through passenger will be brought to Boston nor a cent cheaper; not another ton of through freight will be brought to Boston; but a traffic ten times larger than the highest yet known can be

brought to Boston for \$80,000 per year—which is the interest of \$1,333,333. To save this sum of \$80,000 per year, the State is asked to build another road, which will cost in the end an amount, the annual interest of which will be over a million of dollars! The people of this State are to be taxed over a million dollars yearly to save \$80,000 yearly!

The New York Central Railroad carried last year, *in both directions, through and local*, 1,600,000 tons of freight—all told. I have not the statement of the proportions of through and local freight; about one-quarter of the whole has heretofore been about the proportion of eastward through freight. This would give about 400,000 tons of eastward through freight on the Central road last year. The Western road could have brought the *whole* of this to Boston for an additional cost of \$25,000. Does this constitute an exigency for building the tunnel,—to bring a fraction of this freight to Boston?

I have tried to show the utter folly of building a railroad solely for the purpose of competing at Schenectady for a traffic, every particle of which will come to Boston if the tunnel is never built. But a new hallucination has been conjured up this winter, viz.:

THE ATLANTIC AND ONTARIO LINE.

Mr. Edward Crane stands godfather to this bantling and advocates it with all his usual enthusiasm. Mr. Crane sees very clearly that the idea of building the tunnel to bring Western traffic to Boston is sheer folly; for he says, “When you strike the Hudson where barges or steamboats will float, and tugs take boats to New York, there is a cheaper transit to tide-water, and you may build all the Hoosac Tunnels you please, and your money will be where you put it, bearing no interest.” (Call you that backing your friends?) What then? He goes on: “The point of commercial competition is not at Newburg, not at Albany, not at Troy, but *on Lake Ontario at the point nearest the seaboard*. A line of three hundred and sixty miles from Boston, via Hoosac Mountain, Eagle Bridge, Saratoga, to the best port on Ontario, shows the point of commercial competition for all time.”

Now, in the first place, after the road is built from Saratoga to Lake Ontario, what is to prevent the traffic going from Sara-

toga twenty odd miles by rail to Albany, and then one hundred and fifty miles by water to New York, which he admits is "cheaper than by any other method," instead of going from Saratoga by rail two hundred and twenty odd miles through the tunnel to Boston?

Again, the traffic for this road is to come through the Welland Canal and over Lake Ontario, both of which are closed by ice six months in the year!

Again, who is to build the road from Saratoga to Oswego? Mr. Crane knows full well that New York will not invest a dollar in a road, the purpose of which is to bring Western trade to Boston. He knows, too, as everybody knows, that Massachusetts capitalists who have refused to aid the tunnel will not invest fifteen or twenty millions of dollars in a similar enterprise *outside of the State*. When, therefore, Mr. Crane appeals to "Massachusetts to put the tunnel through, to reach, not Troy, but the point of competition on Lake Ontario," he admits that the road from our State line to Lake Ontario can be built only by the State. I think she will either get or forget the tunnel before she enters upon a still more Quixotic enterprise.

Let us look at this scheme for a moment, soberly if we can. I don't know what Mr. Crane means by a railroad from Saratoga to *Oswego*. The line for such a road must run south of the mountainous region which almost touches the Central Railroad thirty miles west of Albany and extends to Lake Ontario, within a few miles of and parallel to the Central road nearly to Oswego. A road from Eagle Bridge over this route is simply an absurdity. I conclude he must mean the Saratoga and Sackett's Harbor route. This line runs for a hundred miles, more or less, through the "New York Wilderness," a region almost inaccessible, explored rarely by hardy trappers, with an occasional lumberman's shanty on a lake or river—a country which will never be settled until chaos is over-populated. I know something about this region and this railroad route. I have shot many a deer in its forests, caught many a trout in its lakes and rivers, and "shantied" in the railroad surveyors' cabins; and, freshly as I recollect the tortures I endured from musquitoes, black flies and punkies, I am comforted in reflecting that I did not bring upon myself still greater suffering by investing, as I was urged to do, in the Saratoga and Sackett's

Harbor Railroad. Fourteen years ago—how much longer I know not—it was pushed “vigorously.” Enthusiastic but not very far-seeing capitalists were drawn into it; hundreds of thousands, perhaps millions, were sunk; millions of acres of lands were bought by its friends, a large portion of which has reverted to the State for non-payment of taxes; time and again it changed hands; all its projectors lost all they invested, and all that came of it was some fifteen or twenty miles of worthless railroad from Saratoga towards Sackett’s Harbor. I do not believe there is much danger that Massachusetts will resuscitate this defunct concern, or that the suggestion of this scheme will materially influence the judgment of our legislators in deciding upon the expediency of continuing work on the Hoosac Tunnel.

In the last “North American Review,” Mr. Charles Francis Adams, Jr., has an interesting paper on “Boston,” in which he discusses this tunnel question with judicial clearness and fairness. I might take exception to the statement that “the construction of such a road (from Saratoga to Sackett’s Harbor,) would be both feasible and cheap.” Feasibility is a relative term; so, perhaps, is cheapness; but, as compared with New England railroads, this road could hardly be cheap. The route runs for over a hundred miles through the New York wilderness, a region literally covered with mountains, lakes and rivers; with no valleys or level lands that are not covered with water. Coming east, there is one continuous grade, forty to fifty miles long, some forty or fifty feet to the mile, through a country of the most difficult engineering, and where the construction of any railroad, and especially of one fitted for a large traffic, must be very expensive. Still, money would build it, and therefore it is feasible; and if there were sufficient object, it might in the end be cheap. Is there an adequate object? Mr. Adams answers this question very conclusively in the following extracts, (pp. 575 and 576 :—)

“To the Bostonian, however, one doubt suggests itself: Would that movement be to Boston, or would it be to New York? The eastern terminus of the proposed line is Saratoga, and Saratoga is alarmingly near the head waters of the Hudson,—is already connected by railroad with Troy.

“By whomever built, owned, or managed, the proposed road must be no less open to freight moving from Saratoga to New York than from Saratoga to Boston.

“So far as this road is concerned, therefore, Saratoga and Troy must be considered as one, and both as placed at the head-waters of the Hudson,—that river so fatal, which always will flow to the sea. This plan, therefore, while it is brilliant and deserving of careful consideration, while it promises rich returns for the outlay it demands, while to the West it is of the first importance, cannot be considered as undoubtedly tending to the commercial development of Boston. It is more likely to bridge the peninsula from Ontario to the head-waters of the Hudson than from Ontario to tide-water.

“This is certainly the view taken of this project by enterprising New Yorkers. It entered into the discussions of the Detroit Convention in 1865, and Mr. Littlejohn, there representing New York, said of it: ‘The nearest point on Lake Ontario to the Hudson River is Sackett’s Harbor, and next Oswego. From one or the other of these points, private enterprise will soon construct a double track railway to Troy or Albany. A propeller of fifteen hundred tons could leave Chicago and reach the lower end of Lake Ontario in six days. A train could be loaded up by an elevator from the vessel and despatched every two hours, which would take from 200,000 to 250,000 bushels to the Hudson River in every twenty-four hours. The cost of transferring the grain from the vessel to the cars would be but a quarter of a cent per bushel, and the law of gravitation would carry it into the barge at Troy or Albany, and another day would put it on board the ship for Liverpool.’ It may well, therefore, be questioned whether Boston should now turn her attention to the construction of new and dubious lines of communication. While the lines already constructed are but half finished, and not utilized to a tenth part of their capacity, she may find in their instant development ample field for enterprise and investment of capital.

“To their consolidation and enlightened management she may well direct all her superfluous energies for the next five years. She had best fight it out on that line.”

Thus far I have considered this Hoosac Tunnel enterprise only in its commercial and financial bearings and results. As a disturbing element in our politics and legislation, it has been demoralizing and mischievous to an extent which dollars and cents fail to measure.

My attention was first directed to the disturbing agency of this selfish and malignant element by the election of 1861. In

the summer of that year, the controversy arose between Governor Andrew and Mr. Haupt, which resulted in the suspension of the work. The following tables of the votes of the tunnel towns proper in 1860 and 1861, will show perfectly that the people of that region considered the tunnel question paramount to all political issues. It will be seen that these towns, which in 1860 gave a vote of nearly five to one for Andrew over Beach, in 1861 gave an actual majority to Mr. Davis.

I give the votes also for lieutenant-governor in 1861, to show that the hostility was to Governor Andrew.

	GOVERNOR, 1860.		GOVERNOR AND LIEUT. GOV., 1861.			
	Andrew.	Beach.	Andrew.	Davis.	Nesmith.	Bailey.
FRANKLIN COUNTY.						
Buckland,	178	68	10	138	133	28
Charlemont,	157	1	21	3	84	1
Colrain,	214	61	86	89	97	91
Deerfield,	335	120	140	111	156	111
Erving,	63	19	36	20	47	11
Greenfield,	321	114	196	144	266	106
Hawley,	118	3	—	64	81	—
Heath,	87	—	37	18	64	10
Leyden,	75	15	41	18	41	18
Monroe,	30	3	17	18	38	2
Montague,	206	28	125	17	150	17
Orange,	202	79	129	89	133	87
Rowe,	75	3	4	23	58	—
Shelburne,	256	31	39	111	134	25
Wendell,	77	26	64	38	67	35
BERKSHIRE COUNTY.						
Clarksburg,	57	13	3	18	8	16
Florida,	70	9	3	55	58	8
Savoy,	91	41	54	37	48	37
Totals,	2,612	634	1,005	1,011	1,663	605

I assert, without fear of contradiction, that history has no page of political profligacy so black as that. Recur for a moment to the state of affairs then existing. The disaster at Ball's Bluff occurred only two weeks before, darkening the shadows of Bull Run. Every manly heart in the State was moved to aid Governor Andrew in sustaining the national

cause. In such an hour, at an election when Massachusetts had a right to expect that every loyal man would do his duty, through this whole section the cry of Union and Liberty was drowned by the discordant notes, "Tunnel! Tunnel!" making henceforth respectable the baseness of Hook, in the dark days of the Revolution, shouting "Beef! Beef!" through the American camp.

For fifteen years, this mischievous element has dominated the politics and legislation of the State. Not content with controlling the elections in its own section, it has dictated the nominations in the councillor and congressional districts, even where the "tunnel" towns made only an insignificant fraction of the district. It has sent into every State convention of the dominant party a compact band of Hessians, who have succeeded, uniformly, in filling every important place on the ticket with men committed in advance to the tunnel; and even in the last State convention, declaring and waging flagrant war upon me for my opposition to the tunnel proposing; a compromise which was spurned, and withdrawing organized opposition only when they found they were defied and were endangering their own friends. I gratefully acknowledge that there were individual exceptions; but it is notorious that nearly all the leaders from the tunnel towns opposed me as a delegate to a national republican convention on this ground.

The same tactics have been played in the legislature, dictating, almost without exception for these fifteen years, the selection of both presiding officers, controlling the committees and legislation so far as their own purposes were concerned. United and unscrupulous, forming alliances with every scheme of extravagance and plunder, with a lobby more numerous and powerful than their regular members, these mercenaries achieved a success worthy of a better cause. The professional lobby which now infests the State House had its origin and owes its perpetuation solely to the tunnel. This gang, selling themselves to either party upon any question, (except that they never lobby against the tunnel;) prostituting personal and political influences to the wretched purpose of influencing legislation, without regard to public policy; hunting usually in couples, sometimes in full pack; without convictions, without compunctions, without malice, even,—these shameless shysters

ply their disreputable trade in open day in Massachusetts halls of legislation, and hold nightly celebrations over their success in humbugging us simple-minded country people. If there be no other way of getting rid of these parasites upon the body politic,—worse than the frogs and flies of Egypt combined,—it would be better for the legislature to pay every guerilla of them a pension quadruple the amount of their ill-gotten gains. I cannot believe that their influence is at all proportioned to their assurance and their pay; it is the presence of such professional mercenaries that must stir the indignation of every high-minded man.

It is very humiliating to refer to such things as having existed and now existing in Massachusetts. Rather would we shut our eyes to facts which bring a blush of shame to the face of every right-minded citizen, and inflict upon the fair name and upon the honest legislation of the Commonwealth an injury which financial loss can hardly parallel.

And yet this power, hitherto so potent for mischief, would be entirely contemptible, if boldly confronted. Take the map and pick out the senatorial and representative districts, with even one town in them which has any special interest in the tunnel. Follow the Fitchburg, and the Vermont and Massachusetts Railroads, and the line of the Troy and Greenfield road to the State line, and there are not thirty representatives representing even partially “tunnel” towns—one-eighth of the House and the same proportion of the Senate. I state this fact for the benefit of timid politicians—and I know too well how timid the race is. This boasted tunnel influence is very weak. True, dealing with cowards, they are strong;

“What cares the wolf how many sheep there be?”

but faced by brave men they are contemptibly weak. I believe that the action of the present legislature will prove this. I think the same discovery will reach the republican State convention this year. The democratic convention discovered it last year. Shall the children of this world be wiser in their (political) generation than the children of light?

I am most happy to believe that, so far as the action of the present legislature is concerned, we have good reason to

expect fair play. I have no skill at button-holing; but I am told by those who are usually well informed on such matters, that there are some members of the committee on the Hoosac Tunnel this year who mean to exercise their own judgments. For five years, at least, this committee has been, from the start, solid, or nearly so, for the tunnel, blind. This committee has had an important function outside of its duties during the session. It is made a part of its duty to visit the tunnel during the recess, and report to the next legislature upon its condition and management. Hitherto these reports have been simply whitewashing documents, without the slightest original or independent investigation, but mere echoes of the opinions and copies of the statements of the managers for the time being. It has been of the last importance that the tunnellites should secure a committee who should not make troublesome investigations, and hence they have been the more anxious to control the appointments of this committee.

This year they seem to have been less successful than usual. It might seem that the fact that the president of the "Burleigh Drill Company" is a member of the tunnel committee goes a good way to disprove this opinion. It is, indeed, most singular that the president of a drill company should be placed upon a committee one of whose duties is to inquire, *in the interests of the State*, into the workings of his own drill, especially when Mr. Latrobe, in his last report, (p. 31,) expresses a very decided opinion that a better drill may be found, and, indeed, that a drill, which he evidently thinks may be made superior to the Burleigh Drill, has been thrown out and the Burleigh Drill substituted. It is said that the improving of the Burleigh Drill *has cost the State* a large sum of money. Of this I know nothing; but I do know that no person having a pecuniary interest in the purchase of drills by the State ought to be on a legislative committee to inquire into the workings of his own drill. Of course I do not for a moment intimate that the Speaker would have placed that person on the committee if he had been informed of his relations to the Burleigh Drill Company; but the case illustrates the sleepless activity of the tunnel interest to protect itself. At the same time I have the fullest confidence that this committee, for the first time for five years, will investigate this

matter in the conviction that the people of the Commonwealth have some interests to be protected.

LIBERAL LEGISLATION, BUT ADEQUATE RESULTS.

I do not belong to the school of strict utilitarians who condemn every enterprise which does not pay dividends in dollars and cents. Massachusetts endows liberally and wisely her charitable, educational and humane institutions, without expectation of immediate financial returns. It is among the noblest functions of a Christian Commonwealth to develop its resources by generous legislation. But this enterprise can make no such claim. It develops no new sources of material wealth, directly or indirectly, immediately or remotely. It is simply a waste of treasure, taxing the industry of the present and of all future generations, without the possibility of return to mind, body or estate. Taxation of the whole people, for the benefit of the whole either immediately or remotely, even without a return in the shape of income or interest, may be the wisest political economy; but taxation of the whole for the benefit of the few, is robbery.

TAXATION WITHOUT ADEQUATE BENEFITS IS A CRIME.

It is easy for gentlemen of large wealth, or with large incomes, to vote for public expenditures for private benefit. To such persons the payment of taxes involves no sacrifice. But to a majority of the voters of this Commonwealth the payment of taxes does involve sacrifice; not, perhaps, a sacrifice of what they regard as the necessities of life, but a sacrifice of what every family in this community ought to regard as necessities. Every dollar paid in taxes, by a large majority of our voters, deducts just so much from the means of cultivating the mind, of gratifying the taste, of indulging the affections. With a majority of our population, all life, from January to December, from the cradle to the grave, is a struggle to make the ends meet, with too little leisure, and, alas! too little disposition to cultivate the higher faculties; and every dollar paid in taxes deprives every such payer of just what that dollar represents of comfort, enjoyment, improvement which it might purchase. It is a little matter for the legislature to make an appropriation of a million of dollars for the tunnel. The

money comes easily. We don't "pay as we go," but we mortgage the industry of our children for the payment. We give our notes, payable in thirty years, interest payable half-yearly in gold, and Messrs. Baring take our notes and give us greenbacks,—a fair price, and they scatter them over Europe, and twice a year we send over the gold to pay the interest. But pay-day will come; pay-day comes twice a year for the interest. The appropriation is easy; the raising of the money is easy; but it means more than this; sooner or later it means the inexorable tax collector, entering with equal foot the rich man's palace and the poor man's hovel. To the majority of our people it means self-denial; here, the loss of a coveted picture; there, the loss of a comfortable article of furniture; here, the invalid pines for a plate of fruit or a pleasant drive; there, books, amusements, the thousand little gratifications which become necessities to those who can afford them—all these went away in the tax collector's pocket.

I know—and no man is prouder of it—how gladly this people pay taxes for all good purposes; but as I follow these appropriations, as they are distributed to every hamlet and every household, and know that to large masses of people they involve self-denial and suffering, I cannot help denouncing the men who demand these appropriations, for selfish and sectional purposes alone, as oppressors and robbers of the people.

Year after year, as the reports have shown enormous expenditures with barren results, we have been told that these failures were due to an exceptional state of things, but that henceforth better results were certain; and year after year has only repeated the same story of disappointment. General Haupt undertook this work with the entire confidence of all its friends. Success was assured if he could only have the balance of the \$2,000,000 loan, and in 1862 all that the tunnellites asked, Messrs. Crocker, Griswold, &c., was that the legislature should appropriate \$150,000 to compensate him for the injury Governor Andrew's action had done him, and then they could complete the tunnel with the \$2,000,000. This application failed, and at once the whole pack not only deserted General Haupt but denounced the very policy which hitherto they had praised, and paid their court to the rising sun. Mr. Brooks' policy was equally popular until developments showed that the

cost must very largely exceed the largest original estimates of the friends of the tunnel, and they then turned upon him shamelessly and cruelly, depreciating the services of the man who sacrificed himself to their enterprise. "Mr. Brooks was extravagant—Mr. Brooks was a dreamer; we want practical men;" and then Mr. Shute's turn came—an original and fast friend of the tunnel, an exact and methodical man of business, and thoroughly honest; and, therefore, he could not meet the demands of his employers; for, while he flattered himself that he should achieve imperishable fame by organizing this enterprise on an economical system, and thus connect his name with its glorious completion, he had served the State so long in another capacity that he could not throw off the obligation to look after her interests. When Governor Andrew offered him this appointment, Mr. Shute asked my advice about taking it. I said to him—"You think the bad results hitherto have come of bad management. Not doubting that there have been some unpardonable blunders, the Deerfield dam for instance, I tell you the difficulties are inherent. Mr. Brooks' and Mr. Doane's general system is right. They know that the State has entered upon a gigantic work, and they are preparing for it on a large scale, as they ought. You think you can improve their system. You will fail; and, moreover, you will be deserted and denounced by the very men who seem now so cordially to co-operate with you. They will sustain you so long as you play into their hands. Do your duty, and they will abuse you as badly as they ever have abused me. Keep out of the tunnel." He did not follow my advice. I am afraid he will not outlive his regrets that he did not.

And thus, at length, the enterprise has passed into the hands of Colonel Crocker. For the last eighteen months he has been practically absolute dictator. Mr. Crocker was appointed September 1, 1866. In January, 1867, Chief Engineer Doane found that his services were no longer needed, and anticipated a discharge which he knew was inevitable by resigning. Mr. ——— Manning, one of the most accomplished civil engineers in the country, with a large experience in tunnelling, was appointed chief engineer in February, 1867, and entered upon his duties in March. He retired in July. Mr. Assistant-Engineer Granger also resigned a few months ago. Mr. Paul Hill,

superintendent of labor, left in July. Mr. Latrobe is still, nominally, consulting engineer, but his advice has been disregarded, his plans have been scouted, and he will very soon come to the conclusion that he cannot preserve his self-respect and remain in a position where he will be held responsible for results which he cannot control.

Thus, Mr. Crocker has been and is monarch of all he surveys. His policy has been fully endorsed in the Executive Chamber ; his requisitions for money have been honored. He has been, practically, chief engineer and superintendent. He is a man of admitted energy and ability. His whole heart is in his work. For twenty years he has been studying this problem, and here is his solution. In a year of absolute control, under as favorable circumstances, in all respects, as can be expected hereafter, every cubic yard of excavation has cost \$23.40. That is, at the same rate it will cost to complete the tunnel, from twelve to fifteen millions of dollars.

Colonel Crocker will not charge last year's results to bad management ; no such charge can be fairly made. Let no man vote for the appropriation this year under this delusion. The difficulties are inherent and will increase every year, and the cost will increase every year. Three years ago I exposed the folly of building the Deerfield dam, and expressed the opinion that it would cost, at least, \$275,000, and that every dollar of that amount would be lost, as the power would practically be worthless. This year's report makes the cost up to this time between \$274,000 and \$275,000, and the power is practically worthless, as the water is spent in the summer and is unavailable in winter on account of anchor ice. Mr. Crocker expects to get rid of the latter difficulty by opening waste gates at the foot of the canal to draw off the anchor ice. He will find that even if the anchor ice will run through his gates, which is very doubtful, the reduction of head will destroy his power while the gates are open ; and as soon as they are shut, the anchor ice, so long as the conditions are favorable, *will form again*. Steam-power must be furnished to take the place of the entire water-power.

I repeat, the enormous cost heretofore is not the result of bad management, solely or mainly, but of inherent difficulties ; and it is worse than idle to shut our eyes to the facts. We

may go on, year after year, trying experiments, but year after year we shall meet steadily increasing cost.

“ So when a raging fever burns
We shift from side to side by turns;
But 'tis a poor relief we gain
To change the place but keep the pain.”

. It has been a thankless task ; but I have tried to let a little light into this dark cavern. I have given no opinions of my own ; every conclusion is a fair deduction from figures furnished by the friends of the tunnel. Unfortunately the whole truth is not told. We have, properly speaking, no report of last year's operations *from the commissioners* ; we have only a statement from Colonel Crocker. Of course, I do not insinuate deception on his part, but the report is evidently the argument of an advocate, and not the statement of an unbiased inquirer, representing the interests of the State.

It is hardly possible for the legislative committee thoroughly to investigate this matter during the session, and it has happened for the last five years that the subject has been postponed until near the close of the session, when calm deliberation even, to say nothing of new investigation, was out of the question. Legislative visits have not materially added to our scanty stock of knowledge, except, perhaps, in this respect, that results are magnified when the observer is endowed with the happy faculty of seeing double. To the tax-payers of the Commonwealth this is becoming a sober reality, and it would seem the plainest dictate of common economy and common sense that not another dollar shall be sent after the millions that are gone until all that can be known is known. We know now only this : that we are plunging wildly on in the dark, with no seeming purpose on the part of the managers except to get the State so deeply in that it will cost less to go through than to back out.

SHALL THE STATE CONTINUE THIS WORK ?

In other words, shall we lose what we have expended, or expend three or four times as much more, every dollar to be ultimately lost, with no compensation in the way of commercial advantages. As a business proposition this question admits of but one answer. Stop where we are and pocket the loss.

At least this should be done. Suspend the work, and order an investigation made by competent men who have no interest to deceive. Get to the bottom. Then say to the managers of the connecting railroads—"Gentlemen, you have told us that this enterprise would pay. *We* have invested \$1,000,000; you have invested nothing. If ever finished, it benefits you, not us. Upon what terms will you take this elephant?" If it is not worth finishing by the corporations who are to be principally benefited, it surely is not worth finishing by the State.

There is but one clue to guide us out of this worse than Cretan labyrinth, and that leads backwards. "What! the State of Massachusetts back out?" Yes, when on the wrong road. She backed out from her system of coast defence. Driven into that by panic and clamor, after a year or so of reflection she wisely paused, stopped, sold out the useless ordnance, and charged the deficiency to profit and loss; and nothing now remains of the magnificent scheme but wasting earth-works at New Bedford and Marblehead and a pile or two of sand at Provincetown. The cowardly pride or pig-headed obstinacy which persists in going wrong because our predecessors commenced wrong, is unworthy of a great Commonwealth.

Legislators of Massachusetts! Look this thing squarely in the face. Separate it from all extraneous considerations. Settle it just as you would settle a business matter of your own. You have no right to vote away the people's money for an enterprise into which you would not put a dollar of your own, if you had untold millions to spare. Do not sanction any farther squandering of the hard-earned money of the people. Take the Commonwealth of Massachusetts out of this degrading alliance with mercenary jockeys. Deliver our politics from this demoralizing, debauching power. Banish from the State house the venal crew who make it cost a decent man all his self-respect to ask for common justice. Abandon it, give it away, make a bridge of gold, if need be. Add other millions, if upon no better terms the proud old Commonwealth can gain deliverance from the connection which is eating up the substance of her people and poisoning the fountains of private and public morality.

A P P E N D I X.

I have taken some pains to prepare a table which gives the amount which each town in the State pays of a tax of one million dollars. I have figured it upon this basis, so that each person can easily calculate the portion which his own town or county pays of a given amount. Thus, last year, the expenditures on the road and tunnel amounted to \$975,000. Deduct two and a half per cent. from the amount standing in this table against any town or county, and you have the amount paid (or to be paid, which is the same thing,) by that town or county for last year's expenditure. Again, the interest on past appropriations for the tunnel amounted last year to about \$225,000; that is, interest on cost to January 1, 1867, over \$3,000,000, at seven per cent., which is a little less than the average cost of five per cent. gold interest. Adding this interest to the expenditures last year, and we have \$1,250,000 as the cost of the tunnel to the people last year. Add then twenty-five per cent. to the sum against each county or town in the table, and you have the amount which such county or town paid, or must hereafter pay, for last year's work on the Hoosac Tunnel. This table is prepared from chapter 181 of the Acts of 1865, which establishes the basis of taxation until 1875.

This table makes some rather significant revelations as to the distribution of the burdens of taxation for the tunnel. Franklin and Berkshire counties are the only counties which are benefited directly by the tunnel; and a part of the towns in these counties even, have, without the tunnel, better railroad accommodation than a majority of the towns in the State. A few towns in Worcester and Middlesex will have slightly better access westward if the tunnel should be opened; but all these towns are now, in all other respects, as well accommodated as they would be if the tunnel should be opened. Franklin and Berkshire, then, are really the [only counties directly benefited by the tunnel. Of a tax of \$1,000,000, Franklin pays \$14,950, not quite one and a half per cent.; Berkshire pays \$30,080, or three per cent., while Essex pays \$95,250; Norfolk, \$93,660; Bristol, \$60,950; Plymouth, \$31,840, and Barnstable, \$16,250; and not one of these counties would, even to the end of time, receive one dollar benefit from the tunnel!

BASIS OF TAXATION UNTIL 1875.

[Established by Chapter 181, Acts of 1865.]

COUNTY OF SUFFOLK.

TOWNS.	Property.	Tax of \$1,000, including polls at 1-2 mill each.	Amounts paid by each Town of a Tax of \$1,000,000.
Boston, . . .	\$378,303,357 00	\$338 83	\$338,830 00
Chelsea, . . .	7,706,745 00	8 05	8,050 00
North Chelsea, . . .	860,359 00	84	840 00
Winthrop, . . .	406,239 00	45	450 00
Totals, . . .	\$387,276,700 00	\$348 17	\$348,170 00

COUNTY OF ESSEX.

Amesbury, . . .	\$1,677,632 00	\$1 94	\$1,940 00
Andover, . . .	2,702,426 00	2 85	2,850 00
Beverly, . . .	3,359,216 00	3 67	3,670 00
Boxford, . . .	631,942 00	65	650 00
Bradford, . . .	832,083 00	91	910 00
Danvers, . . .	2,237,630 00	2 43	2,430 00
Essex, . . .	912,417 00	1 00	1,000 00
Georgetown, . . .	760,473 00	89	890 00
Gloucester, . . .	4,505,390 00	5 09	5,090 00
Groveland, . . .	666,119 00	77	770 00
Hamilton, . . .	481,423 00	50	500 00
Haverhill, . . .	4,488,107 00	5 13	5,130 00
Ipswich, . . .	1,556,491 00	1 67	1,670 00
Lawrence, . . .	11,240,191 00	11 42	11,420 00
Lynn, . . .	10,053,309 00	10 42	10,420 00
Lynnfield, . . .	604,617 00	62	620 00
Manchester, . . .	766,383 00	85	850 00
Marblehead, . . .	2,131,268 00	2 78	2,780 00
Methuen, . . .	1,292,951 00	1 42	1,420 00
Middleton, . . .	392,445 00	42	420 00
Nahant, . . .	517,194 00	48	480 00
Newbury, . . .	767,849 00	80	800 00
Newburyport, . . .	7,659,960 00	7 80	7,800 00
North Andover, . . .	1,830,829 00	1 88	1,880 00
Rockport, . . .	1,279,717 00	1 48	1,480 00
Rowley, . . .	511,171 00	58	580 00
Salem, . . .	16,192,359 00	15 97	15,970 00
Salisbury, . . .	1,630,089 00	1 83	1,830 00
Saugus, . . .	1,300,074 00	1 33	1,330 00
South Danvers, . . .	3,819,766 00	3 97	3,970 00
Swampscott, . . .	1,449,859 00	1 42	1,420 00
Topsfield, . . .	687,610 00	73	730 00
Wenham, . . .	463,558 00	50	500 00
West Newbury, . . .	940,919 00	1 05	1,050 00
Totals, . . .	\$90,393,467 00	\$95 25	\$95,250 00

COUNTY OF MIDDLESEX.

T O W N S .	Property.	Tax of \$1,000, including polls at 1-2 mill each.	Amounts paid by each Town of a Tax of \$1,000,000.
Acton, . . .	\$854,719 00	\$0 92	\$920 00
Ashby, . . .	508,393 00	58	580 00
Ashland, . . .	632,632 00	76	760 00
Bedford, . . .	489,123 00	52	520 00
Belmont, . . .	3,521,429 00	3 17	3,170 00
Billerica, . . .	1,086,563 00	1 13	1,130 00
Boxborough, . . .	238,592 00	26	260 00
Brighton, . . .	3,812,694 00	3 70	3,700 00
Burlington, . . .	408,136 00	43	430 00
Cambridge, . . .	25,897,971 00	25 21	25,210 00
Carlisle, . . .	354,122 00	38	380 00
Charlestown, . . .	18,292,544 00	18 48	18,480 00
Chelmsford, . . .	1,546,508 00	1 58	1,580 00
Concord, . . .	1,658,881 00	1 67	1,670 00
Dracut, . . .	1,109,304 00	1 20	1,200 00
Dunstable, . . .	391,146 00	40	400 00
Framingham, . . .	2,799,308 00	2 90	2,900 00
Groton, . . .	1,553,920 00	1 70	1,700 00
Holliston, . . .	1,502,682 00	1 69	1,690 00
Hopkinton, . . .	1,595,257 00	1 83	1,830 00
Lexington, . . .	1,747,459 00	1 77	1,770 00
Lincoln, . . .	606,833 00	62	620 00
Littleton, . . .	632,380 00	66	660 00
Lowell, . . .	20,980,041 00	20 74	20,740 00
Malden, . . .	4,040,431 00	4 26	4,260 00
Marlborough, . . .	2,530,622 00	3 06	3,060 00
Medford, . . .	5,491,054 00	5 31	5,310 00
Melrose, . . .	1,704,583 00	1 79	1,790 00
Natick, . . .	1,841,121 00	2 15	2,150 00
Newton, . . .	9,800,738 00	9 37	9,370 00
North Reading, . . .	577,389 00	64	640 00
Pepperell, . . .	924,405 00	1 01	1,010 00
Reading, . . .	1,293,056 00	1 40	1,400 00
Sherborn, . . .	869,539 00	88	880 00
Shirley, . . .	676,275 00	73	730 00
Somerville, . . .	5,683,244 00	5 76	5,760 00
South Reading, . . .	1,778,786 00	1 88	1,880 00
Stoneham, . . .	1,333,637 00	1 57	1,570 00
Stow, . . .	764,278 00	84	840 00
Sudbury, . . .	1,052,778 00	1 10	1,100 00
Tewksbury, . . .	747,624 00	78	780 00
Townsend, . . .	737,352 00	89	890 00
Tyngsborough, . . .	348,137 00	37	370 00
Waltham, . . .	5,552,109 00	5 43	5,430 00
Watertown, . . .	2,757,957 00	2 79	2,790 00
Wayland, . . .	658,073 00	70	700 00
West Cambridge, . . .	2,833,684 00	2 77	2,770 00
Westford, . . .	998,438 00	1 04	1,040 00
Weston, . . .	1,103,274 00	1 09	1,090 00
Wilmington, . . .	563,181 00	59	590 00
Winchester, . . .	1,455,772 00	1 46	1,460 00
Woburn, . . .	4,986,549 00	5 25	5,250 00
Totals, . . .	\$155,324,723 00	\$157 21	\$157,210 00

COUNTY OF WORCESTER.

TOWNS.	Property.	Tax of \$1,000, including polls at 1-2 mill each.	Amounts paid by each Town of a Tax of \$1,000,000.
Ashburnham, . . .	\$789,081 00	\$0 94	\$940 00
Athol, . . .	1,085,516 00	1 31	1 310 00
Auburn, . . .	503,928 00	54	540 00
Barre, . . .	1,797,762 00	1 89	1,890 00
Berlin, . . .	401,831 00	47	470 00
Blackstone, . . .	1,993,024 00	2 31	2,310 00
Bolton, . . .	636,514 00	73	730 00
Boylston, . . .	467,551 00	50	500 00
Brookfield, . . .	973,359 00	1 12	1,120 00
Charlton, . . .	909,729 00	1 01	1,010 00
Clinton, . . .	2,017,299 00	2 10	2,100 00
Dana, . . .	242,117 00	30	300 00
Douglas, . . .	871,651 00	1 01	1,010 00
Dudley, . . .	681,471 00	78	780 00
Fitchburg, . . .	4,240,252 00	4 58	4,580 00
Gardner, . . .	905,324 00	1 09	1,090 00
Grafton, . . .	1,777,973 00	1 99	1,990 00
Hardwick, . . .	1,099,438 00	1 15	1,150 00
Harvard, . . .	932,514 00	99	990 00
Holden, . . .	853,695 00	94	940 00
Hubbardston, . . .	741,433 00	81	810 00
Lancaster, . . .	1,004,802 00	1 05	1,050 00
Leicester, . . .	1,615,868 00	1 70	1,700 00
Leominster, . . .	1,933,122 00	2 07	2,070 00
Lunenburg, . . .	731,560 00	77	770 00
Mendon, . . .	668,709 00	72	720 00
Milford, . . .	3,275,231 00	4 06	4,060 00
Millbury, . . .	1,392,456 00	1 59	1,590 00
New Braintree, . . .	553,709 00	57	570 00
North Brookfield, . . .	1,034,978 00	1 18	1,180 00
Northborough, . . .	893,385 00	93	930 00
Northbridge, . . .	1,104,648 00	1 25	1,250 00
Oakham, . . .	318,003 00	38	380 00
Oxford, . . .	1,137,476 00	1 29	1,290 00
Paxton, . . .	297,237 00	34	340 00
Petersham, . . .	615,779 00	75	750 00
Phillipston, . . .	320,834 00	36	360 00
Princeton, . . .	778,666 00	82	820 00
Royalston, . . .	711,872 00	78	780 00
Rutland, . . .	523,646 00	58	580 00
Shrewsbury, . . .	1,026,968 00	1 08	1,080 00
Southborough, . . .	957,409 00	1 03	1,030 00
Southbridge, . . .	1,696,264 00	1 89	1,890 00
Spencer, . . .	1,363,465 00	1 57	1,570 00
Sterling, . . .	1,087,710 00	1 13	1,130 00
Sturbridge, . . .	864,875 00	98	980 00
Sutton, . . .	1,141,588 00	1 24	1,240 00
Templeton, . . .	979,116 00	1 16	1,160 00
Upton, . . .	736,082 00	87	870 00
Uxbridge, . . .	1,624,174 00	1 72	1,720 00
Warren, . . .	985,109 00	1 13	1,130 00

COUNTY OF WORCESTER—*Concluded.*

TOWNS.	Property.	Tax of \$1,000, including polls at 1-2 mill each.	Amounts paid by each Town of a Tax of \$1,000,000.
Webster, . . .	\$1,060,039 00	\$1 26	\$1,260 00
West Boylston, . . .	860,922 00	98	980 00
West Brookfield, . . .	679,389 00	77	770 00
Westborough, . . .	1,337,740 00	1 51	1,510 00
Westminster, . . .	721,267 00	81	810 00
Winchendon, . . .	1,160,952 00	1 39	1,390 00
Worcester, . . .	19,701,244 00	20 43	20,430 00
Totals, . . .	\$80,857,766 00	\$88 70	\$88,700 00

COUNTY OF HAMPSHIRE.

Amherst, . . .	\$1,860,457 00	\$1 95	\$1,950 00
Belchertown, . . .	1,108,591 00	1 27	1,270 00
Chesterfield, . . .	372,790 00	43	430 00
Cummington, . . .	342,842 00	41	410 00
Easthampton, . . .	1,700,599 00	1 70	1,700 00
Enfield, . . .	610,644 00	64	640 00
Goshen, . . .	152,796 00	18	180 00
Granby, . . .	470,125 00	52	520 00
Greenwich, . . .	261,416 00	30	300 00
Hadley, . . .	1,279,320 00	1 36	1,360 00
Hatfield, . . .	1,442,691 00	1 42	1,420 00
Huntington, . . .	409,395 00	48	480 00
Middlefield, . . .	351,882 00	39	390 00
Northampton, . . .	4,789,965 00	4 92	4,920 00
Pelham, . . .	197,457 00	25	250 00
Plainfield, . . .	239,097 00	29	290 00
Prescott, . . .	221,712 00	26	260 00
South Hadley, . . .	1,103,491 00	1 19	1,190 00
Southampton, . . .	502,448 00	56	560 00
Ware, . . .	1,306,545 00	1 48	1,480 00
Westhampton, . . .	291,384 00	31	310 00
Williamsburg, . . .	1,095,693 00	1 17	1,170 00
Worthington, . . .	409,655 00	46	460 00
Totals, . . .	\$20,510,994 00	\$21 94	\$21,940 00

COUNTY OF HAMPDEN.

Agawam, . . .	\$816,850 00	\$0 90	\$900 00
Blandford, . . .	529,150 00	60	600 00
Brimfield, . . .	719,750 00	77	770 00
Chester, . . .	445,900 00	54	540 00
Chicopee, . . .	3,128,250 00	3 56	3,560 00
Granville, . . .	516,277 00	61	610 00
Holland, . . .	131,000 00	15	150 00

COUNTY OF HAMPDEN—*Concluded.*

TOWNS.	Property.	Tax of \$1,000, including polls at 1-2 mill each.	Amounts paid by each Town of a Tax of \$1,000,000.
Holyoke, . . .	\$2,579,250 00	\$2 77	\$2,770 00
Longmeadow, . . .	1,016,500 00	1 05	1,050 00
Ludlow, . . .	455,050 00	52	520 00
Monson, . . .	1,316,700 00	1 43	1,430 00
Montgomery, . . .	158,850 00	18	180 00
Palmer, . . .	1,254,000 00	1 43	1,430 00
Russell, . . .	212,800 00	25	250 00
Southwick, . . .	604,200 00	66	660 00
Springfield, . . .	13,379,212 00	14 25	14,250 00
Tolland, . . .	298,588 00	32	320 00
Wales, . . .	254,600 00	29	290 00
Westfield, . . .	3,244,600 00	3 52	3,520 00
West Springfield, . . .	1,319,550 00	1 38	1,380 00
Wilbraham, . . .	872,100 00	98	980 00
Totals, . . .	\$33,253,117 00	\$36 16	\$36,160 00

COUNTY OF FRANKLIN.

Ashfield, . . .	\$611,869 00	\$0 68	\$680 00
Bernardston, . . .	484,893 00	52	520 00
Buckland, . . .	526,468 00	67	670 00
Charlemont, . . .	367,216 00	43	430 00
Colrain, . . .	637,954 00	72	720 00
Conway, . . .	703,919 00	80	800 00
Deerfield, . . .	1,215,423 00	1 38	1,380 00
Erving, . . .	173,229 00	21	210 00
Gill, . . .	390,569 00	42	420 00
Greenfield, . . .	1,899,806 00	2 00	2,000 00
Hawley, . . .	182,638 00	30	300 00
Heath, . . .	232,551 00	27	270 00
Leverett, . . .	284,644 00	34	340 00
Leyden, . . .	278,647 00	30	300 00
Monroe, . . .	79,375 00	10	100 00
Montague, . . .	606,737 00	70	700 00
New Salem, . . .	336,476 00	42	420 00
Northfield, . . .	712,054 00	81	810 00
Orange, . . .	599,243 00	77	770 00
Rowe, . . .	180,425 00	21	210 00
Shelburne, . . .	822,620 00	89	890 00
Shutesbury, . . .	219,250 00	27	270 00
Sunderland, . . .	413,827 00	46	460 00
Warwick, . . .	220,658 00	32	320 00
Wendell, . . .	201,657 00	24	240 00
Whately, . . .	665,972 00	72	720 00
Totals, . . .	\$13,048,120 00	\$14 95	\$14,950 00

COUNTY OF BERKSHIRE.

TOWNS.	Property.	Tax of \$1,000, including polls at 1-2 mill each.	Amounts paid by each Town of a Tax of \$1,000,000.
Adams,	\$3,350,551 00	\$3 66	\$3,660 00
Alford,	340,490 00	35	350 00
Becket,	478,120 00	57	570 00
Cheshire,	675,997 00	78	780 00
Clarksburg,	133,234 00	16	160 00
Dalton,	988,160 00	96	960 00
Egremont,	587,619 00	61	610 00
Florida,	152,523 00	28	280 00
Great Barrington,	2,177,071 00	2 31	2,310 00
Hancock,	490,299 00	50	500 00
Hinsdale,	801,755 00	86	860 00
Lanesborough,	661,048 00	71	710 00
Lee,	1,682,411 00	1 84	1,840 00
Lenox,	827,539 00	90	900 00
Monterey,	292,117 00	34	340 00
Mount Washington,	87,676 00	10	100 00
New Ashford,	108,662 00	11	110 00
New Marlborough,	610,727 00	71	710 00
Otis,	311,595 00	40	400 00
Peru,	214,930 00	24	240 00
Pittsfield,	6,378,878 00	6 48	6,480 00
Richmond,	502,277 00	55	550 00
Sandisfield,	612,943 00	69	690 00
Savoy,	273,400 00	34	340 00
Sheffield,	1,206,820 00	1 31	1,310 00
Stockbridge,	1,323,883 00	1 33	1,330 00
Tyringham,	299,594 00	33	330 00
Washington,	289,398 00	33	330 00
West Stockbridge,	613,816 00	72	720 00
Williamstown,	1,160,587 00	1 26	1,126 00
Windsor,	303,324 00	35	350 00
Totals,	\$27,937,444 00	\$30 08	\$30,080 00

COUNTY OF NORFOLK.

Bellingham,	\$463,951 00	\$0 54	\$540 00
Braintree,	1,582,530 00	1 79	1,790 00
Brookline,	12,107,550 00	10 85	10,850 00
Canton,	2,211,313 00	2 28	2,280 00
Cohasset,	1,174,953 00	1 25	1,250 00
Dedham,	4,857,587 00	4 96	4,960 00
Dorchester,	12,521,038 00	11 94	11,940 00
Dover,	358,774 00	38	380 00
Foxborough,	1,284,524 00	1 42	1,420 00
Franklin,	1,046,874 00	1 16	1,160 00
Medfield,	613,155 00	66	660 00
Medway,	2,251,393 00	1 43	1,430 00
Milton,	4,271,263 00	3 93	3,930 00

COUNTY OF NORFOLK—*Concluded.*

TOWNS.	Property.	Tax of \$1,000, including polls at 1-2 mill each.	Amounts paid by each Town of a Tax of \$1,000,000.
Needham, . . .	\$1,798,498 00	\$1 86	\$1,860 00
Quincy, . . .	3,833,508 00	3 97	3,970 00
Randolph, . . .	2,925,254 00	3 16	3,160 00
Roxbury, . . .	23,808,776 00	22 74	22,740 00
Sharon, . . .	723,752 00	79	790 00
Stoughton, . . .	1,742,453 00	2 02	2,020 00
Walpole, . . .	1,132,102 00	1 22	1,220 00
West Roxbury, . . .	10,631,146 00	9 79	9,790 00
Weymouth, . . .	3,345,394 00	3 95	3,950 00
Wrentham, . . .	1,412,051 00	1 54	1,540 00
Totals, . . .	\$95,097,794 00	\$93 66	\$93,660 00

COUNTY OF BRISTOL.

Acushnet, . . .	\$656,500 00	\$0 70	\$700 00
Attleborough, . . .	2,201,660 00	2 54	2,540 00
Berkley, . . .	316,002 00	37	370 00
Dartmouth, . . .	2,432,270 00	2 48	2,480 00
Dighton, . . .	776,779 00	90	900 00
Easton, . . .	1,930,900 00	2 04	2,040 00
Fairhaven, . . .	1,778,217 00	1 84	1,840 00
Fall River, . . .	12,632,419 00	12 92	12,920 00
Freetown, . . .	706,117 00	77	770 00
Mansfield, . . .	750,442 00	90	900 00
New Bedford, . . .	20,525,790 00	19 77	19,770 00
Norton, . . .	842,527 00	94	940 00
Raynham, . . .	1,115,026 00	1 15	1,150 00
Rehoboth, . . .	764,906 00	86	860 00
Seekonk, . . .	496,844 00	54	540 00
Somerset, . . .	865,618 00	97	970 00
Swansey, . . .	755,680 00	82	820 00
Taunton, . . .	8,463,074 00	8 85	8,850 00
Westport, . . .	1,453,897 00	1 59	1,590 00
Totals, . . .	\$59,464,688 00	\$60 95	\$60,950 00

COUNTY OF PLYMOUTH.

Abington, . . .	\$3,059,801 00	\$3 71	\$3,710 00
Bridgewater, . . .	1,992,756 00	2 18	2,180 00
Carver, . . .	459,583 00	53	530 00
Duxbury, . . .	1,006,782 00	1 18	1,180 00
East Bridgewater, . . .	1,136,937 00	1 42	1,420 00
Halifax, . . .	354,039 00	40	400 00
Hanover, . . .	747,591 00	83	830 00
Hanson, . . .	458,168 00	54	540 00
Hingham, . . .	2,391,437 00	2 53	2,530 00
Hull, . . .	150,864 00	16	160 00

COUNTY OF PLYMOUTH—*Concluded.*

TOWNS.	Property.	Tax of \$1,000, including polls at 1-2 mill each.	Amounts paid by each Town of a Tax of \$1,000,000.
Kingston, . . .	\$1,334,298 00	\$1 34	\$1,340 00
Lakeville, . . .	571,124 00	64	640 00
Marion, . . .	459,009 00	51	510 00
Marshfield, . . .	853,777 00	94	940 00
Mattapoisett, . . .	540,118 00	95	950 00
Middleborough, . . .	2,132,878 00	2 44	2,440 00
North Bridgewater, . . .	2,209,339 00	2 71	2,710 00
Pembroke, . . .	575,993 00	68	680 00
Plymouth, . . .	3,145,119 00	3 41	3,410 00
Plympton, . . .	304,305 00	36	360 00
Rochester, . . .	547,181 00	63	630 00
Scituate, . . .	852,105 00	1 03	1,030 00
South Scituate, . . .	840,924 00	91	910 00
Wareham, . . .	882,580 00	1 09	1,090 00
West Bridgewater, . . .	945,350 00	1 02	1,020 00
Totals, . . .	\$27,932,058 00	\$31 84	\$31,840 00

COUNTY OF BARNSTABLE.

Barnstable, . . .	\$2,265,407 00	\$2 48	\$2,480 00
Brewster, . . .	801,452 00	84	840 00
Chatham, . . .	1,100,543 00	1 27	1,270 00
Dennis, . . .	1,181,339 00	1 38	1,380 00
Eastham, . . .	219,948 00	29	290 00
Falmouth, . . .	1,375,661 00	1 50	1,500 00
Harwich, . . .	1,025,217 00	1 28	1,280 00
Orleans, . . .	558,858 00	70	700 00
Provincetown, . . .	1,576,145 00	1 74	1,740 00
Sandwich, . . .	1,669,105 00	1 85	1,850 00
Truro, . . .	361,717 00	52	520 00
Wellfleet, . . .	700,165 00	88	880 00
Yarmouth, . . .	1,440,641 00	1 52	1,520 00
Totals, . . .	\$14,276,198 00	\$16 25	\$16,250 00

COUNTY OF DUKES.

Chilmark, . . .	\$350,801 00	\$0 38	\$380 00
Edgartown, . . .	1,035,467 00	1 13	1,130 00
Gosnold, . . .	112,993 00	11	110 00
Tisbury, . . .	684,714 00	79	790 00
Totals, . . .	\$2,183,975 00	\$2 41	\$2,410 00

COUNTY OF NANTUCKET.

Nantucket, . . .	\$2,152,568 00	\$2.43	\$2,430 00
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ACTUAL AMOUNT OF COMPLETED TUNNEL.

Mr. Crocker's sole aim seems to have been to show apparent linear progress. Hence his frantic efforts to push small headings, assuming, as it would seem, that the delusion, I will not say deception, would not be detected. I omitted, in its proper place, to show the proportion of the work done by reducing the whole number of cubic yards excavated to their equivalent in full-sized tunnel. Here is the calculation, including all work done on the tunnel proper, of course omitting the central shaft:—

The work done by State,	27,113 cubic yards.
At 18 cubic yards per linear foot,	1,500 linear feet.
The work done by Haupt & Co.,	28,886 cubic yards.
Equal to	1,605 linear feet.
Farren completed tunnel,	366 " "
Total completed tunnel,	3,471 " "

Equal to nearly fourteen per cent., or nearly one-seventh of the whole.

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